

Note on the Period of Variation of Barnard's Variable Nebula in Andromeda. By Professor H. H. Turner.

At Professor Barnard's request, I add the following note on the period:—

Selecting the well-determined maxima shown in the first column of the following table, the intervals can be represented by multiples of $27\frac{1}{3}$ days, as shown in the next three columns. In the last column is shown the approximate alteration of period when the multiple is altered by one whole unit.

Epoch of Maximum.	Interval.	Period.	Multiple.	Diff. for 1 Unit.
2399604 (Rosse)	d 1833	= d 27.36	× 67	d 0.4
2401437 (Lassell)	13781	= 27.34	× 504	0.05
2415218	386	= 27.57	× 14	2.0
5604	1116	= 27.22	× 41	0.65
6720	28	= 28	× 1	...
6748	686	= 27.44	× 25	1.0
7434	24	= 24	× 1	...
7458	404	= 27.0	× 15	2.0
7862				
	2644	= 27.26	× 97	

It is clear that the long interval of 13781 days is of little use for defining the period at present; but Barnard's observations and the interval between Rosse and Lassell give about $27\frac{1}{3}$ days.

But the last column shows that, since all the differences are approximate sub-multiples of 2 days, periods of 29.3 or 25.3 days might suit the observations. Below are given the corresponding figures:—

Interval.	Multiple.	Period.	Multiple.	Period.
1833	= 62 ×	29.57	= 72 ×	25.46
386	= 13 ×	29.69	= 15 ×	25.73
1116	= 38 ×	29.37	= 44 ×	25.36
686	= 23 ×	29.83	= 27 ×	25.41
404	= 14 ×	28.9	= 16 ×	25.25
4425	= 150 ×	29.50	= 174 ×	25.44

The accordance for the 29 day period is, however, not good. The periods $27\frac{1}{3}$ and $25\frac{1}{2}$ days divide approximately into 355 days,

482 *Rev. J. Stein, Corrections to Prof. Turner's Paper* LXVIII. 6,

so that at the same time of year they run together nearly for several succeeding years.

Hence the observations do not readily discriminate between them; but those at 2416820, 2417176, and 2417178, when the nucleus was faint, seem to favour the $27\frac{1}{3}$ day period, since they make the epochs 10 or 12 days away from maximum, while the $25\frac{1}{2}$ day period makes them close to maximum. Professor Barnard proposes to make further observations to settle the question.

Corrections to Professor Turner's Paper "On the Classification of Long-period Variable Stars, and a possible Physical Interpretation." By the Rev. J. Stein, S.J., Sc.D.

(Communicated by Professor H. H. Turner, D.Sc., F.R.S.)

[My best thanks are due to Father Stein for pointing out the corrections noted below. According to the general permission given in the last sentence of his letter, I publish it at once.—H. H. T.]

Specola Vaticana, April 3, 1908.

Dear Professor Turner,—Lately I have studied your remarkable article on the "Long-period Variable Stars" (*M.N.*, lxvii. p. 332). My interest was the greater as this is the first serious attempt to bring the long-period light-curves in close relationship to the laws of sun-spot variation.

I take the opportunity for suggesting some ideas by which the number of possible cases in your hypothesis may be still more reduced.

1°. Is there not a little oversight in your paper on page 345? There it is said—

"The mean (foreshortening) factor for the spot may be taken as

$$\int \cos \zeta \, dZ = ..."$$

Should this not be

$$\frac{\int \cos \zeta \, dZ}{\int dZ} ?$$

Then "the total effectiveness" would be (*top line of page 346*)—

$$s = \frac{1}{2\pi} (4\beta \cos \epsilon \sin \lambda + 4 \cos \beta \sin \epsilon \cos \lambda),$$

and in the "polar view"—

$s_1 = \sin \lambda$ (as correctly stated on page 342, line 6; but not as incorrectly on page 346).